

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application:
Joon-Seo Son

Serial No.: 10/672,346

Filed: September 26, 2003

For: DISCRETE PACKAGE HAVING
INSULATED CERAMIC HEAT SINK

Confirmation No. 9664

Group Art Unit: 2811

Examiner: IM, Jungwa M.

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. § 1.111

In response to the final Office Action mailed January 12, 2007, Applicant requests reconsideration of this application in light of the following remarks.

Remarks begin on page 2 of this paper.

REMARKS

Claims 1-17, 19-23, and 25-27 are pending in this application and have been rejected. The pending claims have not been amended.

The following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. In addition, Applicant requests that the Office carefully review any references discussed below to ensure that Applicant's understanding and discussion of the references, if any, is consistent with the Office's understanding.

Claim Rejection: 35 USC § 103

The Office has rejected claims 1-3, 6-8, 11-17, 19-23, and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,598,034 to Wakefield in view of U.S. Patent No. 5,905,299 to Lecap. Applicant respectfully traverses this rejection.

The Office alleges that Wakefield teaches every limitation in the claims except for the limitation that the lead frame pad and the ceramic layer are held in contact with each other only by the molding material. The Office attempts to correct this deficiency of Wakefield by alleging that Fig. 2 of Lecap discloses a "heat sink [214] held in contact with the lead frame pad [210] by using only the molding compound [204] (col. 6, lines 17-23)."

Applicant respectfully disagrees with this interpretation of the disclosure of Lecap. Lecap describes a device containing a pad 210 and a heat spreader 214 that serves as a heat sink. *See column 2, lines 36-48.* Lecap expressly discloses that die pad 210 is "mechanically attached" to

the heat spreader 214. *See column 2, lines 56-57.* Lecap also expressly disclose that legs 216 ensure that the heat spreader 214 is in contact with the die pad 210. *See column 2, lines 57-80.* As such, it is unlikely that the skilled artisan would have understood that Lecap describes a device where the lead frame pad and the ceramic layer are held in contact with each other only by the molding material.

Second, there is no motivation to combine Wakefield and Lecap because both Wakefield and Lecap teach against such a combination. Wakefield specifically states that the heat sink “is secured to the...lead frame using an adhesive 12 or the like,” and that “[a]dhesive 12 may be any suitably thermally conductive adhesive material.” *See column 4, lines 3-10 (emphasis added).* Similarly, Lecap discloses a mechanical attachment of die pad 210 with heat spreader 214. *See column 2, lines 56-80.* Thus, both references describe attaching these two components using something other than the molding material. Accordingly, it is unlikely that the Office’s proposed combination of the references would have suggested to the skilled artisan the limitation that a lead frame pad and a ceramic layer are held in contact with each other only by the molding material.

Third, the skilled artisan would have been motivated to not combine the references proposed by the Office. If the device of Wakefield was modified to be combined with Lecap as proposed by the Office, very small portions (the legs) of the heat spreader 214 would be exposed to the environment. Consequently, the dissipation of the heat spreader could be significantly decreased, leading to a conclusion that the skilled would have been motivated against make the proposed combination.

Thus, the Office has failed to establish a *prima facie* case of obviousness. Applicant, therefore, respectfully requests withdrawal of this rejection.

Claim Rejection: 35 USC § 103

The Office has rejected claims 25 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Wakefield in view of Lecap, and further in view of U.S. Patent No. 6,979,909 to Shinohara. Applicant respectfully traverses this rejection.

As discussed above, the Office has not shown the proposed combination of Wakefield in view of Lecap teaches or suggests each and every limitation in the rejection. And the Office has not argued—much less alleged—that Shinohara suggests those limitations that the proposed combination of Wakefield and Lecap does not teach or suggest.

The Office recognizes that the combination of Wakefield and Lecap fails to teach a process for providing an outer heat sink. Accordingly, the Office turns to Shinohara for teaching of an outer heat sink and argues it would have been obvious to use this outer heat sink in the combination of Wakefield and Lecap. But if the combination of Wakefield and Lecap already contains a heat sink, why would the skilled artisan include another heat sink? It would seem counter-intuitive, and therefore not obvious, as such a modification would raise the complexity and cost of the manufacturing process.

Thus, the Office has not substantiated that the proposed combination of references suggests the limitations in the rejected claims. Applicant accordingly requests withdrawal of this ground of rejection.

Claim Rejection: 35 USC § 103

The Office has rejected claims 4 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Wakefield in view of Lecap, and further in view of U.S. Patent No. 6,501,156 to Nakanishi. Applicant respectfully traverses this rejection.

The Office recognizes that the combination of Wakefield and Lecap do not disclose a lead frame pad formed to a thickness of 0.5 mm. The Office argues that Nakanishi describes such a limitation and argues that it would have been obvious to include this feature in the combined teachings of Wakefield and Lecap to accommodate the manufacturing specification.

Even if the Office's argument is true, an argument Applicant traverses for the record, it does not substantiate that the combination of references teach or suggests every limitation in the rejected claims. The rejected claims contain the limitation of a lead frame pad and a ceramic layer are held in contact with each other using only a molding material. But for the reasons noted above, the Office has not shown that the combined teachings of Wakefield and Lecap teach such a limitation. And the Office has not even argued—much less alleged—that Nakanishi discloses such a limitation. And since neither the Wakefield/Lecap combination nor Nakanishi individually teaches or suggests this limitation, it would be highly unlikely that the Office could show that the combination of these references would suggest this limitation.

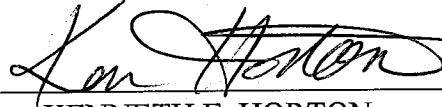
Thus, the Office has not shown that a proper combination of the cited references suggests every limitation recited in the rejected claims. Accordingly, Applicant requests withdrawal of this ground of rejection.

CONCLUSION

For the above reasons, as well as the reasons of record, Applicant respectfully requests the Office to withdraw the pending grounds of rejection and allow the pending claims.

If there is any fee due in connection with the filing of this Request for Reconsideration including a fee for any extension of time not accounted for above, please charge the fee to our Deposit Account No. 50-0843.

Respectfully Submitted,

By 
KENNETH E. HORTON
Reg. No. 39,481

Date: 4/6/2007